Investigation of Motor Skills Level of TK Students During the Covid 19 Pandemic

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Abstract. Possessing motor abilities at a young age has a long-term impact on physical activity. Kindergarten children engaged in online learning, increased screen usage, and spent time at home during the COVID-19 epidemic. There is a lot of research that evaluates the influence of the COVID-19 pandemic on all parts of human existence, but little work that ties it to kindergarten pupils' mobility skills during the epidemic. The scarcity of literature on the development of movement abilities in kindergarten pupils during the COVID-19 epidemic is a reflection of the students' low of motor skills. Objective: To obtain information on the motor skills of kindergarten students during the COVID-19 pandemic as a basis for post-pandemic policy making. The method used in this research is descriptive with a quantitative approach. There were 80 kindergarten students who were sampled with an age range of 4–5 years. Motor skills test conducted using TGMD-2. Results: information obtained on the level of motor skills of kindergarten students during the COVID-19 pandemic was in the Poor category. The results of this study can be used as a basis for developing the motor skills learning process after the COVID-19 pandemic.

Keywords: Motor Skills · Kindergarten Students · Covid 19

1 Introduction

The emergence of the covid 19 virus at the end of 2019 paralyzed many sectors of life in society [1, 2]. The virus, which was initially detected, came from the Wuhan City area, Hubei, China, and quickly spread throughout the world. The World Health Organization [3] declared the disease caused by the coronavirus (COVID-19) a pandemic. The impact of the covid 19 virus is so great for humans that it causes a public health emergency where this virus is capable of causing a high death rate in humans [4–6]. Countries around the world anticipate the spread of the virus through various policies including travel restrictions, the use of masks, maintaining distance between people, the use of hand sanitizers, closing tourist attractions, closing public facilities, implementing online schools, quarantine, and using vaccines [7].

Education is the basic mechanism that forms the basis for the formation of eternal human qualities [8]. Through the educational process, children are stimulated to develop

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their potential in the cognitive, affective, and psychomotor domains. The COVID-19 pandemic affects many sectors, one of which is education, with more than 11 billion school students affected by school closures [9]. The literature reveals that the closure of academic organizations nationally and internationally affects more than 91% of the world's education community [10]. The learning process that was previously carried out face-to-face has turned into a limited online-based distance learning process [11–13]. The online learning process raises several obstacles such as unpreparedness of students in the online learning process, unpreparedness of infrastructure, and lack of teacher competence [14].

Fundamental motor skills (FMS) are gross and fine movement patterns that involve large and small muscles so that they are able to perform a series of organized basic movements [15, 16]. FMS is divided into 3 categories, the ability to propel the body through space, the ability to push or manipulate objects in space, and stability skills or the ability to maintain postural control [17]. Ownership of FMS does not come by itself, it takes a combination of active play and a structured training program to develop FMS [18]. The FMS ability is useful throughout life in carrying out physical activities. FMS becomes a building block for more complex movements required when participating in sports, games, or physical activities including object control and manipulatives [19–21]. Possession of FMS becomes the basis for a child to perform a series of organized basic movements involving various body segments and provides the basis for achieving higher motor competence [16].

Movement patterns in the preschool period have not been directed, children who experience delays in FMS development are at risk of sustaining delays in FMS skills until grade 1 [22]. The preschool years become a major developmental stage for the acquisition and development of FMS [23]. The reason for developing FMS during preschool is because generally preschool students already have a positive perception of physical competence, so that it becomes an opportunity to grow skills [24]. The literature reveals that FMS is best developed in childhood and then refined into sport-specific skills during adolescence and adulthood [25]. Ages 3 and 6 are the right time to start learning FMS because basic motor skills are starting to develop [26]. The development of FMS competence in the preschool period is a fundamental mechanism that encourages involvement in physical activity [27]. Mastery of FMS from an early age affects physical activity (PA) making children physically literate so that it contributes to physical activity, body movement abilities, active lifestyle, and social behavior [28–30]. Possession of FMS skills from an early age can have a positive impact on children's motor, affective, and cognitive domains [31, 32].

In Indonesia, the development of FMS is one of the learning programs given to kindergarten students. FMS learning is suitable for kindergarten students based on students spending most of their time in school and kindergarten is a suitable place to develop and improve physical activity and motor skills, where students are facilitated by teaching staff and supporting facilities [33, 34]. At the age of 3–6 years, the level of physical and cognitive development of children has been able to receive FMS learning stimuli. The basis for providing FMS programs in kindergartens is because ownership of FMS is able to promote children's physical, social, and cognitive development [35, 36]. Further research revealed that FMS is associated with the development of neuromotor, cognitive,

social, and emotional aspects of childhood [37]. The FMS learning program in Indonesia is provided through learning balance, catching the ball, walking on the catwalk, climbing, hanging, jumping, ball games, and gymnastics [38–40]. The FMS learning program is given using the principle of playing while learning, or learning while playing [41].

The state of the COVID-19 pandemic, as determined by WHO, impacts the globe of education from March 11, 2020 until the conclusion of this research on December 30, 2021. During the Covid-19 pandemic, the principle of education policy in Indonesia is to prioritize the health and safety of students, educators, education staff, families, and society in general, while also taking into account student growth and development and psychosocial conditions in order to provide educational services. The administration released several educational policies, including the Circular of the Minister of Education and Culture Number 4 of 2020 and the Circular of the Secretary General of the Ministry of Education Number 15 of 2020 regarding the online learning process [42]. Another strategy is the NUMBER 516 YEAR 2020 instructions for the execution of learning during the Covid 19 pandemic, in which the face-to-face learning process is carried out in stages with zone provisions [43]. The strategy was developed to avoid crowds, which might lead to an increase in the transmission of the COVID-19 virus. During the COVID-19 epidemic, the policy of restricting educational activities in schools seemed to have an impact on learning results. Based on some information on the influence of the COVID-19 pandemic on the world of education, the researchers were compelled to investigate data on the impact of COVID-19 on kindergarten kids' movement skills.

2 Material and Method

The method used is a survey with the aim of describing the condition of the motor skills of kindergarten students during the covid 19 pandemic. The approach uses a cross-sectional one snapshot through direct observation with the aim of obtaining generalizable data. Numerical data analysis comes from test results using the standard TGMD-2 instrument. The TGMD-2 instrument has a goodness-of-fit index (GFI) of 0.96 and an adjusted GFI (AGFI) of 0.95. In conducting the test there are five procedures carried out (1) Filling out the testor identity form, (2) Giving a demonstration by the testor to students, (3) students are given the opportunity to try the test form, (4) giving a re-demonstration if students do not understand, (5) students do two repetitions on each test item. There are 12 test items which are run, gallop, hop, leap, horizontal jump, slide, stationary dribble, catch, kick, overhand throw, underhand roller [44]. The points obtained from the 12 test items are processed to determine the gross motor quotient in order to obtain a rating description. Purposive sampling was used in sampling in this study. The use of this technique is based on certain considerations, one of which is the Covid-19 pandemic condition which makes only a few schools carry out the learning process. There were 80 kindergarten students with an age range of 4–6 years consisting of 45 male students and 35 female students who were involved in this study. The process of measuring motor skills was assisted by 8 testors who had understood the implementation of the test procedure.

Table 1. Data on Motor Skills for Locomotor Sub-Tests

No	Tes	Subtes	n	Minimum Score	Maximum Value Gain	Average test results
1	*Lokomotor*	*Run*	80	3	5	4,338
2		*Gallop*	80	2	4	3,1
3		*Hop*	80	3	7	4,7
4		*Leap*	80	3	4	3,6
5		*Horizontal jump*	80	3	5	4,24
6		*Slide*	80	2	4	3,09

3 Results

Based on the results of measuring motor skills on the locomotor subtest using the TGMD-2 instrument, the following data were obtained (Table 1).

Based on the results of the locomotor test, it is known that in the run sub-test students get an average of 4.33 points from a maximum score of 8, students make a lot of mistakes on the test criteria 2 hovering in the air and on the test criteria 3 foot landing. In the Gallop sub-test, students got an average of 3.1 points out of a maximum score of 8, students made a lot of mistakes on the test points of 3 flying positions in the air and 4 foot landings. In the Hop sub-test, students get an average of 4.7 points out of a maximum score of 10, students make a lot of mistakes on test points 2 in the position of the non-supporting leg position, on test points 3 bending the arm and swinging, and 5 jumping with the non-dominant leg. In the Leap sub-test, students got an average of 3.6 points out of a maximum score of 6, students made a lot of mistakes on the test points of 2 floating positions in the air and 3 arms opposite the front legs. In the Horizontal jump sub-test, students get an average of 4.24 points from a maximum score of 8, students make a lot of mistakes on the test criteria for 3 landing positions and test criteria for 4 arm positions. In the Slide sub-test, students get an average of 3.09 points from a maximum score of 8, students make a lot of mistakes on the test criteria 2 steps, test criteria 3 are four continuous steps to the right side and test criteria 4 are four continuous steps to the left side (Fig. 1).

From the results of the locomotor test, it is known that the average motor skills of students are still low. Of the 6 locomotor sub-tests, students only achieved points below 55% of the maximum points. Slide and gallop skills are the skills with the lowest acquisition scores. The form of slide and gallop movements that are foreign to students and the absence of movement learning during the COVID-19 pandemic makes it difficult for students to perform movement skills (Table 2).

Based on the results of the control object test, it is known that in the Stricking a stationary ball sub, students get an average of 4.2 points out of a maximum score of 10, students make a lot of mistakes on test criteria 3 rotation when swinging, on test criteria 4 transfer weight to the forefoot, and on test criteria 5 the bat is in contact with the ball. In the Stationary dribble sub-test, students get an average of 2.38 points from

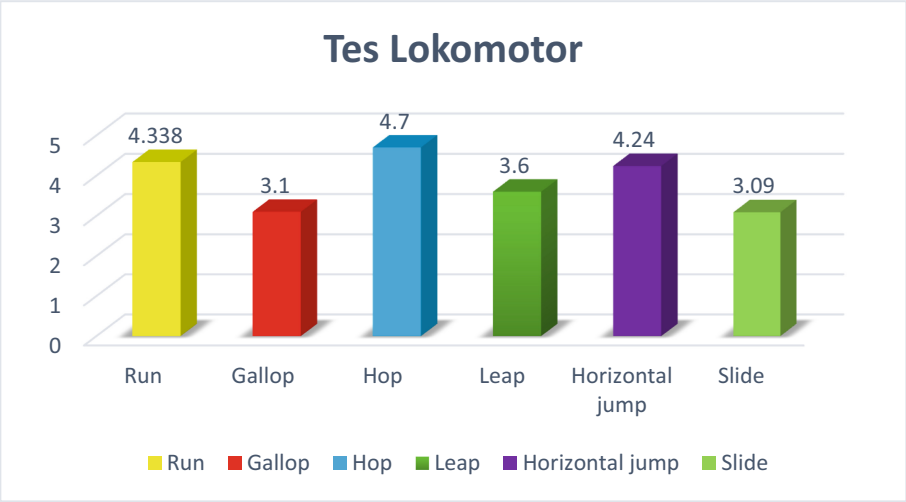

Fig. 1 Locomotor Test

Table 2. Motor Skills Data Control Object Test

No	Sub Tes	Subtes	n	Minimum Score	Maximum Value Gain	Average test results
1	*Objek Control*	*Stricking a stationary ball*	80	2	5	4,2
2		*Stationary dribble*	80	0	4	2,38
3		*Cath*	80	3	4	3,61
4		*Kick*	80	6	3	4,33
5		*Over hand throw*	80	3	4	3,53
6		*Under hand Roll*	80	2	4	3,3

a maximum score of 8, students make a lot of mistakes on the test points of 3 hovering positions in the air and 4 foot landings. In the Cath sub-test, students got an average point of 3.61 from a maximum score of 6, students made a lot of mistakes on test points 2 for arm extension position, on test points 3 catching the ball with their hands. In the Kick sub-test, students get an average of 4.33 points from a maximum score of 8, students make a lot of mistakes on test point 1, approaching the ball continuously and test points for 2 long steps (leap) just before contact with the ball. In the Over hand throw sub-test, students got an average of 3.53 points from a maximum score of 8, students made a lot of mistakes on test criteria 2 hips and shoulders, test criteria 3 weight transfer and foot steps and test criteria 4 Follow-through. In the Under hand Roll sub-test, students get an average of 3.3 points from a maximum score of 8, students make a lot of mistakes

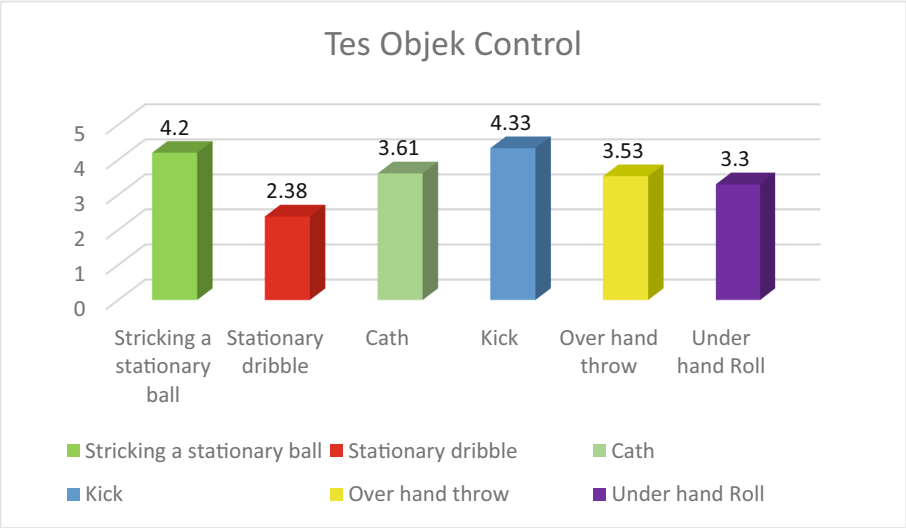

Fig. 2 Control Object Test

Table 3. Motor Skills Data for Kindergarten Students

No	Sub Tes	n	Average Raw score	Average Standard Score	Descriptive Rating Based on Standard Score	Averag Percentile	Averag*Gross Motor Quotient*	Descriptive Ratings By Gross Motor Quotient
1	*Lokomotor*	80	22,73	5,87	Poor	10,16	76,45	*Poor*
2	*Objek Control*	80	21,03	6,275	Below Average	12,33		

on the test criteria 2 steps, test criteria 3 bend your knees to lower your body and test criteria 4 Release the ball close to the floor (Fig. 2).

From the results of the control object test, it is known that the average motor skills of students are still low. Of the 6 control object sub-tests, students only achieved points below 55% of the maximum points. Stationary dribble and under hand roll skills are the skills with the lowest acquisition scores. In the stationary dribble movement, students have not been able to control the ball, students tend to bounce the ball strongly so that the ball bounce is not controlled and students have not been able to repeat the ball bounce. In the Under hand roll movement, many students do not bend their knees so that the released ball bounces high (Table 3).

The results of data processing obtained data on average raw score, average standard score, descriptive rating based on standard score, average percentile, average gross motor quotient, and descriptive ratings based on gross motor quotient. Raw score is useful for comparison between sub-tests. In the locomotor sub-test, it is known that 80 students obtained an average raw score of 22.73 while the control object was 21.03. The standard

score is a conversion from the raw score, this score is useful for comparing sub-tests and obtaining descriptive rating information. From the standard score data, it is known that 80 students have an average locomotor standard score of 5.87 with a descriptive rating of Poor, while the average standard score for the control object is 6.27 with a below average descriptive rating. Gross motor quotient is a combination of locomotor sub-tests and control objects, gross motor quotient scores can be interpreted into descriptive ratings. In this study, the gross motor quotient score of 76.45 when interpreted in descriptive ratings was in the Poor category.

4 Discussion

The results of the study revealed that the motor skills of kindergarten students during the COVID-19 pandemic were in the Poor category. The pandemic situation has made the government set measures such as locking down, implementing online schools and imposing restrictions on community activities. The government's policies are capable of reducing the quantity of virus propagation, but they have the ability to alter a person's level of physical activity, which has an unfavorable effect on the mental and physical health of persons, particularly children [45]. The COVID-19 epidemic has led in a decline in motor skills as a result of children's activities at home, such as increased sleep, eating habits, and screen time [46]. According to research, children are more vulnerable to harmful habits when they are not in school, such as increased sedentary behavior, which has a detrimental influence on the development of children's motor competence [47]. The appearance of a pandemic influence on children's movement development is caused by restrictions on activities in the community such as sports that create obstacles to physical activity and at the same time, an increase in sitting time [48]. Physical activity decreased and inactive time increased during the pandemic, according to the research [49]. Differences in parents' assessments of their children's physical activity levels contributed to the loss in motor skills during the COVID-19 pandemic [50]. During the epidemic, parents did not promote their children's physical activity and motor learning due to a lack of information about the value of physical exercise and motor learning. Children who lack playmates are less likely to engage in physical exercise, and they are more likely to engage in sedentary behavior, which has a detrimental influence on their motor abilities [51].

Of the 12 sub-tests conducted, it shows that on all test items students get low points. Possession of low motor skills if left unchecked can have a negative impact on children's physical, cognitive, social development, and active lifestyle [52]. Children who do not master motor skills will have difficulty carrying out prolonged motor activities [54]. The importance of mastering motor skills and the negative effects of low motor skills, and the impact of the COVID-19 pandemic need special attention. Appropriate handling is needed to target the acceleration of motor skill improvement after the COVID-19 pandemic. Several steps that might be taken are providing a basic environment to promote motor skill development, intervening in learning programs to catch up with motor skills, allocating more time for skills learning motor skills, motor skills learning assignments at home.

5 Conclusions

This study provides an overview of the condition of motor skills during the covid 19 pandemic. It is known that during the covid 19 pandemic the skill level of kindergarten students measured using the TGMD-2 instrument was in the Poor category. During the pandemic, kindergarten students spend a lot of time at home and do a lot of sedentary behavior. The decline in physical activity and learning basic motor skills in schools conducted online is indicated as the cause of the decline in children's motor skills.

The decline in motor skills in kindergarten students proves the influence of the COVID-19 pandemic on the motor skills of kindergarten students. There needs to be interventions implemented after the COVID-19 pandemic to promote the improvement of motor skills. The intervention is expected to be able to accelerate so that students' motor skills become better so that kindergarten students are ready to perform more complex movement skills in the future.

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